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Proposal for the development of EZ Tracker

Prepared by Ryan Maynard, Jonas Gamao, Delroy Christie
Computer Engineering Technology Student
https://github.com/YamiYukiSenpai/EZTracker

Executive Summary

As a student in the Computer Engineering Technology program, I will be integrating the knowledge and skills I have learned from our program into this Internet of Things themed capstone project. This proposal requests the approval to build the hardware portion that will connect to a database as well as to a mobile device application. The internet connected hardware will include a custom PCB with the following sensors and actuators: SSD1306 Monochrome OLED, MPR121 12-Point Capacitive Touch Sensor, and LSM303 Accelerometer & Magnetometer. The database will store: Step Count, Calories, Weight, Age, Heigh, Date of Birth, Name, E-mail. The mobile device functionality will include: View calories burned, steps, and direction through the SSD1306 OLED. Toggle start/stop/pause with the MPR121 Touch Sensor. Collect and interpret data with LSM303 Accelerometer & Magnetometer. This will be further detailed in the mobile application proposal. I will be collaborating with the following company/department: School of Media Studies & Information Technology, and School of Hospitality Recreation and Tourism. This semester, our group will consist of the following students, who are also building similar hardware this term and working on the mobile application with me: Ryan Maynard, Jonas Gamao, Delroy Christie. The hardware will be completed in CENG 317 Hardware Production Techniques independently and the application will be completed in CENG 319 Software Project. These will be integrated together in the subsequent term in CENG 355 Computer Systems Project as a member of a 2 or 3 student group.

Background

The problem solved by this project is Simplfying the current pedometer for the aging generation looking to get healthy. Most older users are turned off by complex devices and UIs. Being able to monitor their own health by implementing a simple and user-friendly interface can lead to a more active lifestyle. A bit of background about this topic is that Pedometers/wearable/portable technology is used everywhere. With the baby boomers becoming an aging population, and with health concerns on the rise, this easy to use system can promote a healthier lifestyle with the added ease of use. By using IoT/Cloud software, users can track their usage and compare it over days/weeks/months to ensure they are getting the exercise needed.
Existing products on the market include [1]. I have searched for prior art via Humber's IEEE subscription selecting "My Subscribed Content" [2] and have found and read [5][6][7] which provides insight into similar efforts.
In the Computer Engineering Technology program we have learned about the following topics from the respective relevant courses:

- Java Docs from CENG 212 Programming Techniques In Java,
- Construction of circuits from CENG 215 Digital And Interfacing Systems,
- Rapid application development and Gantt charts from CENG 216 Intro to Software Engineering,
- Micro computing from CENG 252 Embedded Systems,
- SQL from CENG 254 Database With Java,
- Web access of databases from CENG 256 Internet Scripting; and,
- Wireless protocols such as 802.11 from TECH152 Telecom Networks.

This knowledge and skill set will enable me to build the subsystems and integrate them together as my capstone project.

Methodology

This proposal is assigned in the first week of class and is due at the beginning of class in the second week of the fall semester. My coursework will focus on the first two of the 3 phases of this project:

Phase 1 Hardware build.
Phase 2 System integration.
Phase 3 Demonstration to future employers.

Phase 1 Hardware build
The hardware build will be completed in the fall term. It will fit within the CENG Project maximum dimensions of 12 13/16" x 6" x 2 7/8" (32.5cm x 15.25cm x 7.25cm) which represents the space below the tray in the parts kit. The highest AC voltage that will be used is 16Vrms from a wall adaptor from which +/- 15V or as high as 45 VDC can be obtained. Maximum power consumption will be 20 Watts.

Phase 2 System integration
The system integration will be completed in the fall term.
Phase 3 Demonstration to future employers

This project will showcase the knowledge and skills that I have learned to potential employers.

The brief description below provides rough effort and non-labour estimates respectively for each phase. A Gantt chart will be added by week 3 to provide more project schedule details and a more complete budget will be added by week 4. It is important to start tasks as soon as possible to be able to meet deadlines.
Stacking Headers, Case Revisions

Concluding remarks
This proposal presents a plan for providing an IoT solution for A user friendly, Cloud/IoT based pedometer to monitor health for the technologically inexperienced aging population. This is an opportunity to integrate the knowledge and skills developed in our program to create a collaborative IoT capstone project demonstrating my ability to learn how to support projects such as the initiative described by [5][6][7]. I request approval of this project.

References
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[5] Genovese, V., Mannini, A., & Sabatini, A. M. (2017). A Smartwatch Step Counter for Slow and Intermittent Ambulation. IEEE Access, 5, 13028-13037. doi:10.1109/access.2017.2702066

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